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U.S APPLICATION NO. (If known see 37 C.F.R 1.5)

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	(EARLIEST) PRIORITY DATE CLAIMED
PCT/JP00/01271	**03 March 2000**	**03 March 1999**

TITLE OF INVENTION: **TRANSMITTING APPARATUS, RECEIVING APPARATUS, TRANSMITTING AND RECEIVING SYSTEM, TRANSMITTING METHOD, AND RECEIVING METHOD**

APPLICANTS FOR DO/EO/US: **Fumihiko NISHIO, Yoshihisa GONNO, Kazuo HARAOKA, Kazuhiko TAKABAYASHI and Yasuaki YAMAGISHI**

Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)), including **8** sheets of formal drawings and a copy of the International Search Report.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventors (35 U.S.C. 371(c)(4)).
10. ☐ The annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
    PCT/ISA/210, PCT/RO/101
    References for IDS

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I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" Service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents and Trademarks, Box PCT Washington, DC 20231.

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U S. APPLICATION NO (If known, see 37 C F R. 1 50)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NO.
	PCT/JP00/01271	450106-02388

17. ☒ The following fees are submitted: (CALCULATIONS /PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO... ... $1000.00

International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....$ 860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) Not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO (37 CFR 1.445(a)(2))..... .....$ 710.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) But all claims did not satisify provisions of PCT Article 33(1)-(4).....$ 690.00

International preliminary examination fee paid to USPTO (37 CFR 1 482) and all claims satisfied provisions of PCT Article 33(1)-(4).....$ 100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = ($ 860.00

Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)). ($ /

9 Claims /	Number Filed	/Number Extra	/Rate	(
Total Claims	/ 9 - 20 =	/ 0	X $18.00	($ 0.00
Independent Claims	/ 7- 3 =	/ 4	/X $80.00	($ 320.00
Multiple dependent claim(s) (if applicable)			/+ $260.00	($

TOTAL OF ABOVE CALCULATIONS = ($ 1,180.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity (/ statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28). (/

SUBTOTAL = **($ 1,180.00**

Processing fee of **$130.00** for furnishing the English translation later than (/ ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).+ ($ /

TOTAL NATIONAL FEE = ($ 1,180.00

Fee for recording the enclosed assignments (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3 28, 3 31) **$40.00** per property + ($ **40.00**/ ($ /

TOTAL FEES ENCLOSED = ($ 1,220.00

(Amount to be: / (refunded /$

(charged /$

a. ☒ Our checks in the amount of **$1,220.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 50-0320 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-0320**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Dated: November 2, 2000

SIGNATURE

WILLIAM S. FROMMER
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25,506
REGISTRAT ION NUMBER

DESCRIPTION

Transmitting Apparatus, Receiving Apparatus, ~~Transmitting and Receiving System, Transmitting Method, and Receiving Method~~

Technical Field

The present invention relates to a transmitting apparatus, a receiving apparatus, a transmitting and receiving system, a transmitting method, and a receiving method for use with a digital broadcasting system that is structured on for example the Internet and that delivers contents data.

Related Art

Although many techniques for delivering contents data have been proposed, document data written in HTML (Hyper Text Mark-up Language) is delivered on the Internet (hereinafter, these document data is referred to as HTML document). In the HTML, hyper links are represented using URIs (Uniform Resource Identifier) so as to correlate a plurality of HTML documents.

In recent years, in the field of broadcasts, a digital broadcasting system that is structured on the Internet and that delivers HTML documents therethrough has been studied. The digital broadcasting system uses digital televisions and so forth as receiving terminal units. In a conventional digital broadcast that corresponds to DVB (Digital Video Broadcasting)

standard or the like, identifiers of ID values such as event_id, service_id, and component_tag are assigned to video/audio streams. In such a digital broadcasting system, URIs are added to individual resources of delivered data (video/audio stream, digital data of a digital broadcast, and so forth). Each of delivered HTML documents that are broadcast can be hyper-linked.

As a method for adding a URI to broadcast data while keeping the compatibility with the conventional digital broadcasting system, a descriptor that contains a URI can be used. In this method, when a link is selected with a URI of an HTML document by a receiver, a relevant URI is searched from a descriptor area of a received MPEG-2 section table or the like and a resource that contains the URI is accessed (displayed). In this case, since a URI is written as text data, the URI searching process includes a text pattern matching process. Thus, on the receiver side, the load imposed for this process is heavier than that for the process for simply comparing ID values.

Therefore, an object of the present invention is to provide a transmitting apparatus, a receiving apparatus, a transmitting and receiving system, a transmitting method, and a receiving method that allow the load imposed to a receiving apparatus and so forth to be alleviated for a contents data identifying process for matching URIs.

Disclosure of the Invention

The invention of claim 1 is a receiving apparatus for receiving contents data, comprising:

a receiving means for receiving data that is transmitted;

a first identifier converting means for converting an indefinite length identifier contained in the data into a fixed length identifier;

a reception information storing means for storing contents data contained in the data, the indefinite length identifier, and the fixed length identifier;

an inputting means for inputting a user's request for contents data;

a second identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier; and

a contents data identifying means for comparing the fixed length identifier stored in the reception information storing means with the fixed length identifier that is output from the second identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

The invention of claim 3 is a transmitting and receiving system, comprising:

a transmitting apparatus having:

a transmission data storing means for storing contents data,

an identifier adding means for adding an indefinite length identifier to the contents data, and

a transmitting means for transmitting the contents data and the indefinite length identifier; and

a receiving apparatus having:

a receiving means for receiving data that is transmitted,

a first identifier converting means for converting an indefinite length identifier contained in the data into a fixed length identifier,

a reception information storing means for storing contents data contained in the data, the indefinite length identifier, and the fixed length identifier,

an inputting means for inputting a user's request for contents data,

a second identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier, and

a contents data identifying means for comparing the fixed length identifier stored in the

reception information storing means with the fixed length identifier that is output from the second identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

The invention of claim 4 is a transmitting apparatus for transmitting contents data, comprising:

a transmission data storing means for storing contents data;

an identifier adding means for adding an indefinite length identifier to the contents data;

an identifier converting means for converting the indefinite length identifier into a fixed length identifier; and

a transmitting means for transmitting the contents data, the indefinite length identifier, and the fixed length identifier.

The invention of claim 5 is a receiving apparatus for receiving contents data, comprising:

a receiving means for receiving data that is transmitted;

a reception information storing means for storing contents data contained in the data and a fixed length identifier;

an inputting means for inputting a user's

request for contents data;

an identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier; and

a contents data identifying means for comparing the fixed length identifier stored in the reception information storing means with the fixed length identifier that is output from the identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

The invention of claim 7 is a transmitting and receiving system, comprising:

a transmitting apparatus having:

a transmission data storing means for storing contents data,

an identifier adding means for adding an indefinite length identifier to the contents data,

an identifier converting means for converting the indefinite length identifier into a fixed length identifier;

a transmitting means for transmitting the contents data, the indefinite length identifier, and the fixed length identifier; and

a receiving apparatus having:

a receiving means for receiving data that is transmitted,

a reception information storing means for storing contents data and an indefinite length identifier contained in the data and the fixed length identifier,

an inputting means for inputting a user's request for contents data,

an identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier, and

a contents data identifying means for comparing the fixed length identifier stored in the reception information storing means with the fixed length identifier that is output from the identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

The invention of claim 8 is a transmitting method for transmitting contents data, comprising the steps of:

storing contents data;

adding an indefinite length identifier to the

contents data;

converting the indefinite length identifier into a fixed length identifier; and

transmitting the contents data, the indefinite length identifier, and the fixed length identifier.

The invention of claim 9 is a receiving method for receiving contents data, comprising the steps of:

receiving data that is transmitted;

storing contents data, an indefinite length identifier, and a fixed length identifier contained in the data;

converting the indefinite length identifier contained in the data into a fixed length identifier;

inputting a user's request for contents data;

converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier;

comparing the result of the first identifier converting step with the result of the second identifier converting step; and

identifying the contents data corresponding to the user's request using the result of the fixed length identifier comparing step.

According to the present invention set forth in claims 1 and 3, an indefinite length identifier such

as a URI added to contents data included in data received by the receiving apparatus is converted into a fixed length identifier using the Hash function or the like. In addition, an indefinite length identifier added to contents data corresponding to a user's request is converted into a fixed length identifier using the Hash function or the like. These identifiers are compared. Corresponding to the compared result, the contents data corresponding to the user's request is identified.

According to the present invention set forth in claims 4, 5, 7, and 9, after an indefinite length identifier is added to contents data, a fixed length identifier into which an indefinite length identifier has been converted using the Hash function or the like is further added to the contents data. The resultant contents data is transmitted by a transmitting apparatus. The fixed length identifier is compared with a fixed length identifier into which an indefinite length identifier added to contents data corresponding to a user's request has been converted using the Hash function or the like by a receiving apparatus. Corresponding to the compared result, the contents data corresponding to the user's request is identified.

Brief Description of Drawings

Fig. 1 is a schematic diagram showing an example of the structure of a digital broadcasting

system according to an embodiment of the present invention;

Fig. 2 is a block diagram showing an example of a structure of a contents data transmitting portion of a broadcasting station according to the embodiment of the present invention;

Fig. 3 is a block diagram showing an example of the structure of a receiving terminal according to the embodiment of the present invention;

Fig. 4 is a schematic diagram showing an example of a descriptor for adding a URI according to the embodiment of the present invention;

Fig. 5 is a schematic diagram showing an example of the data structure of an EIT;

Fig. 6 is a schematic diagram showing an example of a script for adding a URI according to the embodiment of the present invention;

Fig. 7 is a flow chart for explaining a URI converting process according to the embodiment of the present invention;

Fig. 8 is a flow chart for explaining a URI comparing process according to the embodiment of the present invention;

Fig. 9 is a block diagram showing an example of the structure according to a contents data transmitting portion of the broadcasting station according to another embodiment of the present

invention;

Fig. 10 is a block diagram showing an example of the structure of a receiving terminal unit according to the other embodiment of the present invention;

Fig. 11 is a schematic diagram showing an example of a descriptor used for adding a URI according to the other embodiment of the present invention; and

Fig. 12 is a schematic diagram showing an example of a notation for adding a URI according to the other embodiment of the present invention.

Best Modes for Carrying out the Invention

Fig. 1 shows an example of the structure of a digital broadcasting system according to an embodiment of the present invention. Referring to Fig. 1, information providers 101_1, 101_2, ... each have a server, a HDD (Hard Disk Drive), and so forth. Each of the information providers 101_1, 101_2, ... stores and/or transmits contents data supplied using a database composed of such structural portions. Examples of contents data are WWW pages and video/audio streams. The information providers 101_1, 101_2, ... are connected to a broadcasting station 102 through a bidirectional network 105. The information providers 101_1, 101_2, ... can transmit contents data to the broadcasting station 102 through the bidirectional network 105.

In addition, the information providers 101_1, 101_2, ... are connected to receiving terminal units

103_1, 103_2, ... through the bidirectional network 105. The information providers 101_1, 101_2, ... can transmit contents data to the receiving terminal units 103_1, 103_2, ... through the bidirectional network 105.

The broadcasting station 102 has a server, a HDD, and so forth. The broadcasting station 102 stores and/or supply contents data that is transmitted to a broadcasting network 104 to a database composed of the structural portions thereof. Examples of the contents data are broadcast programs. The broadcasting station 102 is connected to the receiving terminal units 103_1, 103_2, ... through the broadcasting network 104. Thus, the broadcasting station 102 can supply the contents data and a URI that identifies thereof to the receiving terminal units 103_1, 103_2, ... through the broadcasting network 104. In addition, the broadcasting station 102 can receive contents data from the information providers 101_1, 101_2, ... through the bidirectional network 105 or a dedicated line and supply the received contents data to the receiving terminal units 103_1, 103_2, ... through the broadcasting network 104.

Each of the receiving terminal units 103_1, 103_2, ... designates desired contents data with a URI. Examples of contents data designated with a URI are a program that is transmitted (broadcast) through the broadcasting network 104 on real time basis, a program that is pre-transmitted through the broadcasting

network 104 and stored to the receiving terminal units 103_1, 103_2, ..., and data that is accessed through the bidirectional network 105 on demand basis. Although the present invention can be applied to a contents data identifying process that is accessed through any route, in the following description, it is assumed that contents data that is transmitted through the broadcasting network 104 is identified.

Fig. 2 shows an example of the structure of a contents data transmitting portion of the broadcasting station 102. Referring to Fig. 2, a transmission information storing portion 201 stores contents data supplied to the receiving terminal units 103_1, 103_2, ... In addition, the transmission information storing portion 201 may temporarily store contents data supplied by the information providers 101_1, 101_2, ... The transmission information storing portion 201 may be a HDD or the like. Data stored in the transmission information storing portion 201 is supplied to a URI adding portion 202 at a predetermined timing. The URI adding portion 202 adds a URI as an identifier to each resource of the supplied information, encodes URI information, and supplies the encoded URI information to a transmitting portion 203. The transmitting portion 203 transmits the data supplied from the URI adding portion 202 to the broadcasting network 104 or the like.

Fig. 3 shows an example of the structure of the receiving terminal unit 103_1. Referring to Fig. 3, a receiving portion 301 receives data transmitted through the broadcasting network 104 or the like and supplies the reception data to a URI converting portion 302. The URI converting portion 302 performs a process for converting URI information contained in the supplied data into a Hash function value and obtains a fixed length identifier (this identifier is referred to as Hash function value). The fixed length hash function value is supplied and stored to a reception information storing portion 303 along with data received by the receiving portion 301.

The Hash function is a conversion of which two different inputs that become the same output values cannot be found due to necessity of a huge calculation amount. In other words, an indefinite length URI is converted into a fixed length hash function value whose length is shorter than the length of the URI.

On the other hand, the user of the receiving terminal unit 103_1 inputs a URI added to desired contents data through a URI input portion 307. The URI that is input by the user is supplied to a URI converting portion 305. The URI converting portion 305 converts the input URI into a fixed length hash function value as an identifier. An output of the URI converting portion 305 is supplied to a URI comparing

portion 306. The URI comparing portion 306 appropriately reads the Hash function value stored in the reception information storing portion 303 and compares it with the Hash function value supplied from the URI converting portion 305.

The comparing process for comparing fixed length Hash functions values can be performed by the URI comparing portion 306 easier and quickly than the comparing process for comparing indefinite length URIs. However, because of the characteristic of the Hash function, there is a small probability of which different URIs may be converted into the same Hash function value. Thus, even if Hash function values match each other, a process for determining whether or not URIs match each other is performed.

As the compared result, when the Hash function value stored in the reception information storing portion 303 matches the Hash function value supplied from the URI converting portion 305, the following process is performed.

In other words, indefinite length URIs corresponding to Hash function values that match as the determined result (namely, an infinite length URI that is stored in the reception information storing portion 303 and a URI that is input through the URI converting portion 305) are compared. As the compared result, when the two indefinite length URIs match each other,

it can be determined that the contents data to which the indefinite length URI is added is contents data that the user desires. The identified data is supplied from the URI comparing portion 306 to a displaying portion 307 of a digital television receiver or the like. With the displaying portion 307, the user can see and listen to desired information. The structure of the receiving terminal unit 103_1 may be the same as the structure of the receiving terminal unit 103_2.

Fig. 4 shows an example of a descriptor used in a conventional digital broadcast. The descriptor is used for adding a URI. In this example, the descriptor contains a descriptor tag, a descriptor length, and N characters (each is composed of eight bits). On the other hand, in SI (Service Information) corresponding to DVB or the like, an EIT (Event Information Table) is used. The EIT contains information of for example a program title and broadcast time data added to contents data. Fig. 5 shows an example of the data structure of the EIT. Information about each program is represented in a frame 1201. The frame 1201 has event_id 1203 that identifies each program and a descriptor area 1202. Using this descriptive format, with reference to a script in the descriptor shown in Fig. 4, a URI is correlated with event_id.

Next, the URI adding process performed by the URI adding portion 202 (refer to Fig. 2) will be

described. Fig. 6 shows an example of a script for adding a URI. In this example, a URI "lid://www.abc.com/abc_news/night" is added to a program identified by event_id = 100, namely, ABC news that starts at 21:00 and whose duration is 60 minutes. Thus, a HTML document transmitted as a data broadcast contains an URI "lid://www.abc.com/abc_news/ night". When the user selects it, a channel tuning operation for the program or a timer recoding operation thereof can be performed.

Next, with reference to a flow chart shown in Fig. 7, the URI converting process performed by the URI converting portion 302 (refer to Fig. 3) will be described. A URI descriptor is extracted from received data (at step S701). With a URI character string contained in the URI descriptor, a Hash function value corresponding to for example MD 5 (Message Digest 5) is calculated (at step S702). As the result at step S702, an indefinite length character string uri is converted into a Hash function value (namely, a fixed length character string) h(uri). The hash function value h(uri) is added to contents data. The resultant contents data is stored to the reception information storing portion 303 (at step S703).

Next, with reference to a flow chart shown in Fig. 8, the URI comparing process performed by the URI comparing portion 306 (refer to Fig. 3) will be described. A Hash function value corresponding to MD 5

or the like is calculated with an input character string of a URI character string uri_1 that is input by the user through the URI input portion 304 (refer to Fig. 3). Thus, a Hash function value h(uri_1) is obtained (at step S801). The Hash function value h(uri_1) is compared with the Hash function value h(uri_i) calculated and stored (refer to Fig. 7) (at step S802). As the determined result at step S802, when the Hash function value h(uri_1) matches the Hash function value h(uri_i), the flow advances to step S803. Otherwise, the flow advances to step S805.

At step S803, indefinite length URI character strings that have not been converted into fixed length Hash function values (namely, uri_1 and uri_i) are compared. Because of the characteristic of the Hash function, there is a probability of which Hash function values corresponding to different input URI character strings match each other. Thus, at step S803, it is determined whether uri_1 matches uri_i. As the determined result at step S803, when uri_1 matches uri_i, the flow advances to step S804. Otherwise, the flow advances to step S805. At step S804, a process for displaying contents data to which uri_i that matches uri_1 is added on the displaying portion 307 or the like is performed. At step S805, the value of i is changed. Thereafter, the flow advances to step S802.

In the above-described processes, indefinite

length URI character strings are converted into fixed length identifiers using the Hash function or the like. With the fixed length identifiers, a comparing process is performed. Only when a match is detected, with the indefinite length URIs corresponding to the fixed length identifiers, a comparing process is performed. Thus, the frequency of which the process for comparing indefinite length URIs can be decreased. Consequently, the process for comparing URIs can be effectively performed at high speed. In addition, the load imposed to the receiving terminal units 103_1, 103_2, ... can be alleviated.

In the above-described embodiment, the process for converting URI character strings into Hash function values is performed by the receiving terminal units 103_1, 103_2, ... Alternatively, such a process can be performed on the transmitter side. This case will be described as another embodiment of the present invention. The structure of a transmitting and receiving system according to the other embodiment of the present invention may be the same as that according to the above-described embodiment of the present invention. Next, with reference to Fig. 9, a broadcasting station 1102 according to the other embodiment of the present invention will be described.

In Fig. 9, as a transmission information storing portion 1201 and a URI adding portion 1202, the

transmission information storing portion 201 and the URI adding portion 202 shown in Fig. 2 can be used. A URI converting portion 1204 is disposed downstream of the URI adding portion 202. The URI converting portion 1204 performs a process for converting an indefinite length URI character string added to contents data by the URI adding portion 1202 into a fixed length identifier using the Hash function or the like. The URI converting portion 1204 adds the fixed length character string to an output of the URI adding portion 202. The generated data is supplied to a transmitting portion 1203. The transmitting portion 1203 performs a process for transmitting the supplied data to the broadcasting network 104 or the like.

Next, with reference to Fig. 10, a receiving terminal unit 1103_1 according to the other embodiment of the present invention will be described. In Fig. 10, a receiving portion 1301 receives data transmitted through the broadcasting network 104 or the like. The data received by the receiving portion 1301 is data of which an indefinite length URI, a fixed length identifier that is generated using the Hash function or the like, and so forth are added to contents data. The data received by the receiving portion 1301 is supplied to a reception information storing portion 1303. As the reception information storing portion 1303, a URI input portion 1307, a URI converting portion 1305, a

URI comparing portion 1306, and a URI input portion 1307, the reception information storing portion 303, the URI input portion 307, the URI converting portion 305, the URI comparing portion 306, and the displaying 307 shown in Fig. 3 can be used, respectively.

Fig. 11 shows an example of a descriptor for adding a URI according to the other embodiment of the present invention. As with the example of the descriptor according to the above-described embodiment described with reference to Fig. 4, the descriptor shown in Fig. 11 contains a descriptor tag, a descriptor length, N characters, and a URI Hash function value URI_hash_value.

Fig. 12 shows an example of a script for storing an URI in an EIT descriptor area. In this example, as with an example of a script according to the above-described embodiment shown in Fig. 6, a URI "lid://www.abc.com/abc_news/night" is added to a program identified by event_id = 100, namely, ABC news that starts at 21:00 and whose duration is 60 minutes. However, in this example, a Hash function value b2a11afc568b6df62badef691cf0b1ed corresponding to the Hash function MD 5 is also added.

According to the present invention, an indefinite length identifier such as a URI added to contents data included in data received by the receiving apparatus is converted into a fixed length

identifier using the Hash function or the like. In addition, an indefinite length identifier added to contents data corresponding to a user's request is converted into a fixed length identifier using the Hash function or the like. These identifiers are compared. Corresponding to the compared result, the contents data corresponding to the user's request is identified.

In addition, according to the present invention, after an indefinite length identifier is added to contents data, a fixed length identifier into which an indefinite length identifier has been converted using the Hash function or the like is further added to the contents data. The resultant contents data is transmitted by a transmitting apparatus. The fixed length identifier is compared with a fixed length identifier into which an indefinite length identifier added to contents data corresponding to a user's request has been converted using the Hash function or the like by a receiving apparatus. Corresponding to the compared result, the contents data corresponding to the user's request is identified.

In these processes, fixed length identifiers are effectively compared at high speed. Only when a match is detected, indefinite length identifiers are compared.

Thus, in the process for identifying contents data, the frequency of which the comparing process that

is slow and ineffective can be suppressed. As a result, the load imposed to the receiving apparatus can be alleviated. Thus, the process for receiving contents data can be performed effectively at high speed.

It should be understood by those skilled in the art that the foregoing and various other changes, omissions, and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the present invention.

CLAIMS

1. A receiving apparatus for receiving contents data, comprising:

receiving means for receiving data that is transmitted;

first identifier converting means for converting an indefinite length identifier contained in the data into a fixed length identifier;

reception information storing means for storing contents data contained in the data, the indefinite length identifier, and the fixed length identifier;

inputting means for inputting a user's request for contents data;

second identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier; and

contents data identifying means for comparing the fixed length identifier stored in said reception information storing means with the fixed length identifier that is output from said second identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

2. The receiving apparatus as set forth in claim 1,

wherein when said contents data identifying means has determined that the fixed length identifier stored in said reception information storing means matches the fixed length identifier that is output from said second identifier converting means as the compared result of the fixed length identifiers, said contents data identifying means compares the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means with the indefinite length identifier corresponding to the fixed length identifier that is output from said second identifier converting means and generates the compared result of the indefinite length identifiers, and

wherein when said contents data identifying means has determined that the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means matches the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means with the indefinite length identifier corresponding to the fixed length identifier that is output from said second identifier converting means as the determined result of the indefinite length identifiers, said contents data identifying means determines that the contents data identified by the

indefinite length identifier is the contents data corresponds to the user's request.

3. A transmitting and receiving system, comprising:

a transmitting apparatus having:

transmission data storing means for storing contents data,

identifier adding means for adding an indefinite length identifier to the contents data, and

transmitting means for transmitting the contents data and the indefinite length identifier; and

a receiving apparatus having:

receiving means for receiving data that is transmitted,

first identifier converting means for converting an indefinite length identifier contained in the data into a fixed length identifier,

reception information storing means for storing contents data contained in the data, the indefinite length identifier, and the fixed length identifier,

inputting means for inputting a user's request for contents data,

second identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier, and

contents data identifying means for comparing the fixed length identifier stored in said reception information storing means with the fixed length identifier that is output from said second identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

4. A transmitting apparatus for transmitting contents data, comprising:

transmission data storing means for storing contents data;

identifier adding means for adding an indefinite length identifier to the contents data;

identifier converting means for converting the indefinite length identifier into a fixed length identifier; and

transmitting means for transmitting the contents data, the indefinite length identifier, and the fixed length identifier.

5. A receiving apparatus for receiving contents data, comprising:

receiving means for receiving data that is transmitted;

reception information storing means for storing contents data contained in the data and a fixed

length identifier;

inputting means for inputting a user's request for contents data;

identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier; and

contents data identifying means for comparing the fixed length identifier stored in said reception information storing means with the fixed length identifier that is output from said identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

6. The receiving apparatus as set forth in claim 5,

wherein when said contents data identifying means has determined that the fixed length identifier stored in said reception information storing means matches the fixed length identifier that is output from said second identifier converting means as the compared result of the fixed length identifiers, said contents data identifying means compares the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means with

the indefinite length identifier corresponding to the fixed length identifier that is output from said second identifier converting means and generates the compared result of the indefinite length identifiers, and

wherein when said contents data identifying means has determined that the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means matches the indefinite length identifier corresponding to the fixed length identifier stored in said reception information storing means with the indefinite length identifier corresponding to the fixed length identifier that is output from said second identifier converting means as the determined result of the indefinite length identifiers, said contents data identifying means determines that the contents data identified by the indefinite length identifier is the contents data corresponds to the user's request.

7. A transmitting and receiving system, comprising:

a transmitting apparatus having:

transmission data storing means for storing contents data,

identifier adding means for adding an indefinite length identifier to the contents data,

identifier converting means for converting the indefinite length identifier into a fixed length

identifier;

transmitting means for transmitting the contents data, the indefinite length identifier, and the fixed length identifier; and

a receiving apparatus having:

receiving means for receiving data that is transmitted,

reception information storing means for storing contents data and an indefinite length identifier contained in the data and the fixed length identifier,

inputting means for inputting a user's request for contents data,

identifier converting means for converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier, and

contents data identifying means for comparing the fixed length identifier stored in said reception information storing means with the fixed length identifier that is output from said identifier converting means, generating the compared result of the fixed length identifiers, and identifying the contents data corresponding to the user's request using the generated compared result of the fixed length identifiers.

8. A transmitting method for transmitting

contents data, comprising the steps of:

storing contents data;

adding an indefinite length identifier to the contents data;

converting the indefinite length identifier into a fixed length identifier; and

transmitting the contents data, the indefinite length identifier, and the fixed length identifier.

9. A receiving method for receiving contents data, comprising the steps of:

receiving data that is transmitted;

storing contents data, an indefinite length identifier, and a fixed length identifier contained in the data;

converting the indefinite length identifier contained in the data into a fixed length identifier;

inputting a user's request for contents data;

converting an indefinite length identifier added to the contents data corresponding to the user's request into a fixed length identifier;

comparing the result of the first identifier converting step with the result of the second identifier converting step; and

identifying the contents data corresponding to the user's request using the result of the fixed length identifier comparing step.

ABSTRACT

A URI converting portion 302 converts a URI contained in data received by a receiving portion 301 into a fixed length URI. The fixed length URI is stored to a reception information storing portion 303 along with the data received by the receiving portion 301. On the other hand, a URI of desired contents data that is input from a URI input portion 307 is converted into a fixed length URI by a URI converting portion 305. A URI comparing portion 306 compares the fixed length URI stored in the reception information storing portion 303 with an output of the URI converting portion 305. When a match is detected as the compared result, the indefinite length URIs corresponding to the fixed length URIs (namely, the URI contained in the received data and the URI that is input from the URI input portion 307) are compared. When a match is detected as the compared result, it is determined that the contents data to which the indefinite length URI is added is that contents data that the user desires.

Fig. 1

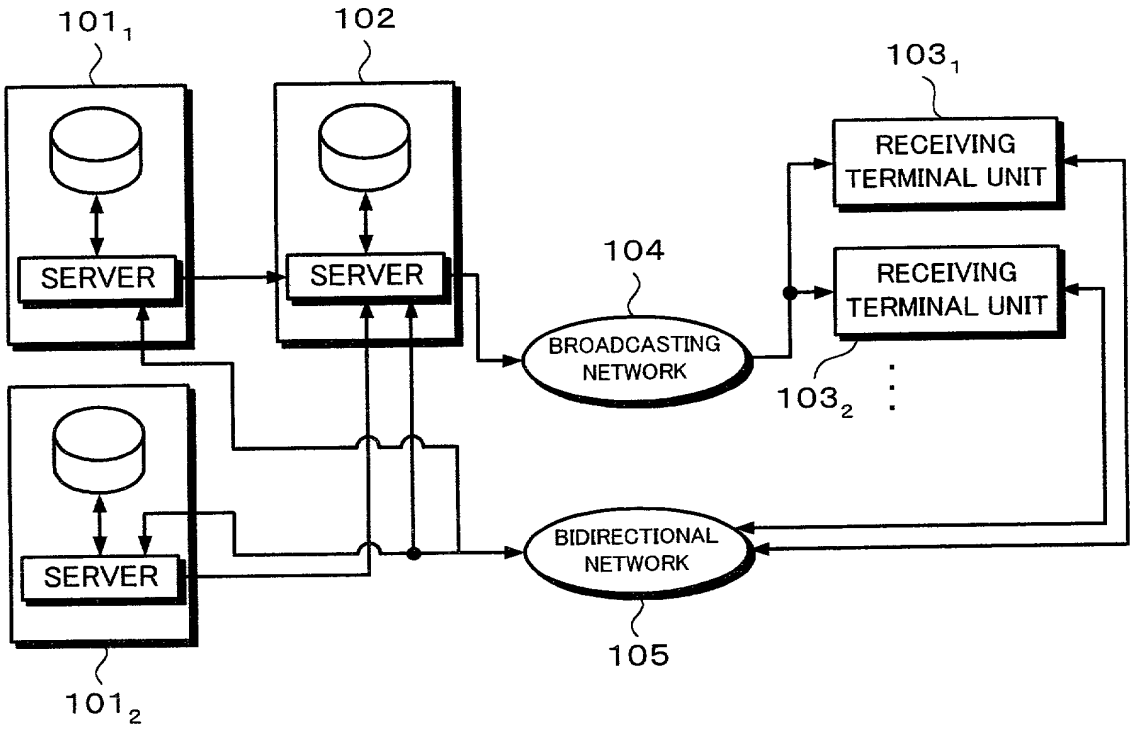
101 1
102
103 1
RECEIVING TERMINAL UNIT
SERVER
SERVER
104
RECEIVING TERMINAL UNIT
BROADCASTING NETWORK
103 2
SERVER
BIDIRECTIONAL NETWORK
105
101 2

Fig. 2

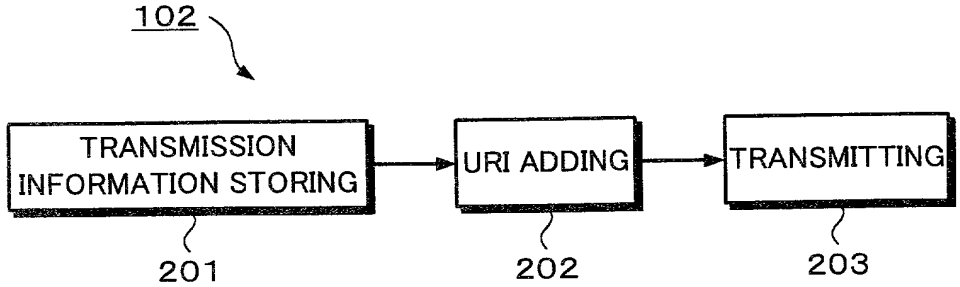
102
TRANSMISSION INFORMATION STORING
URI ADDING
TRANSMITTING
201
202
203

Fig. 3

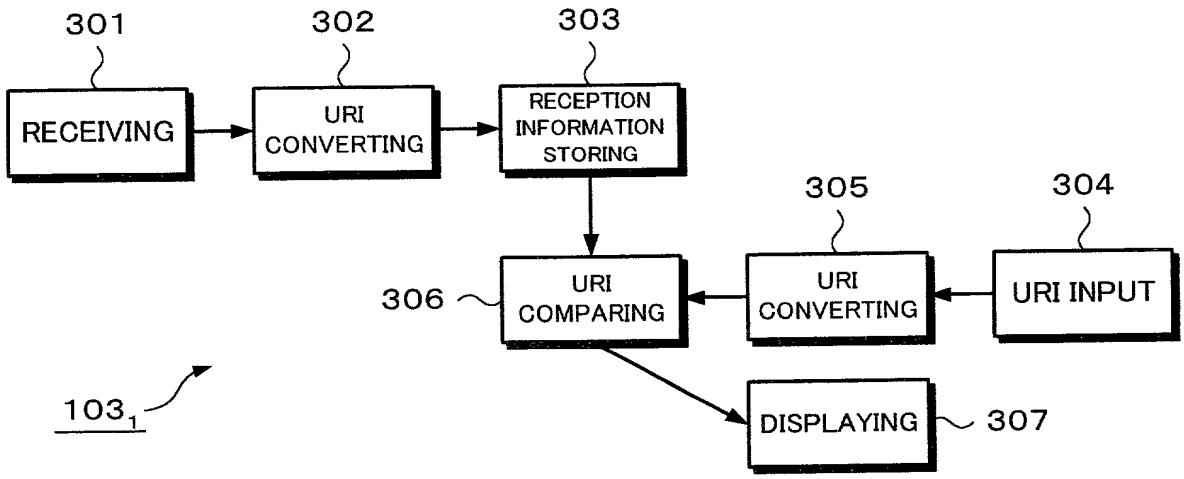

Fig. 4

```
URI_descriptor( ) {
        descriptor_tag
        descriptor_length
        for (i=0;i<N;i++) {
                URI_character
        }
}
```

Fig. 5

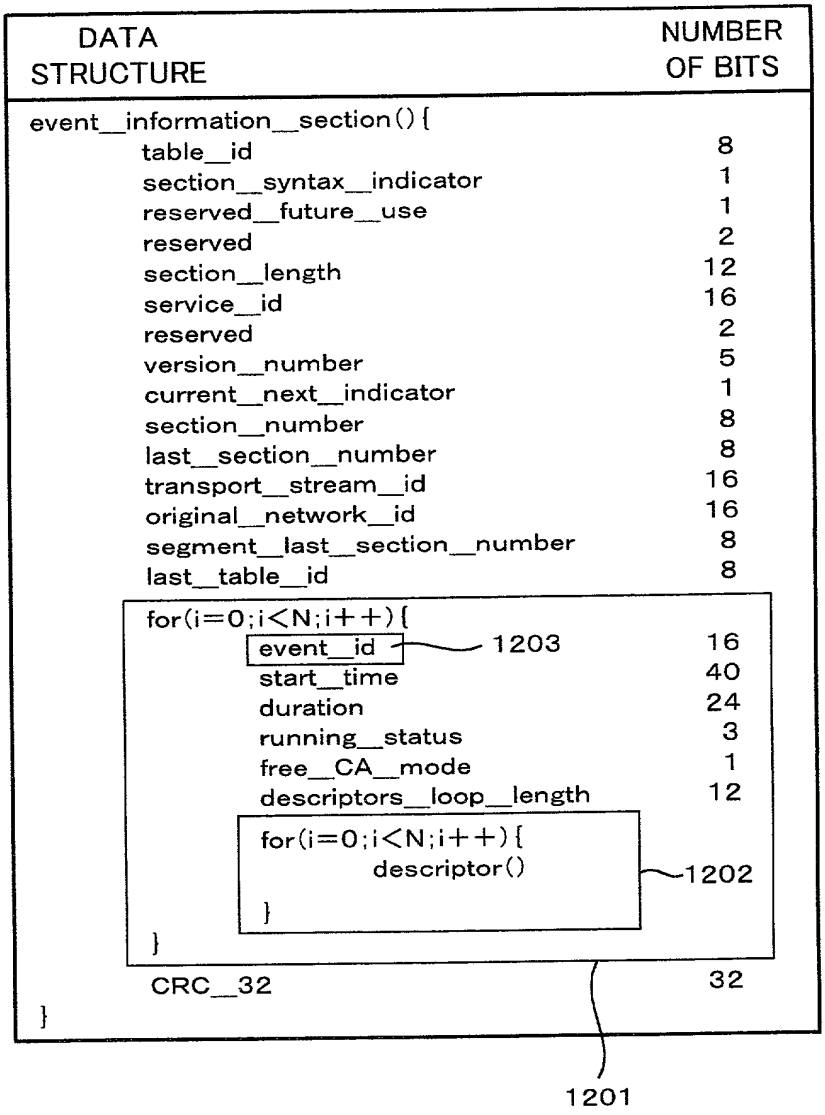

Fig. 6

event_id: 100
start_time: 21:00
duration: 60min
URI_descriptor: lid://www.abc.com/abc_news/night

Fig. 7

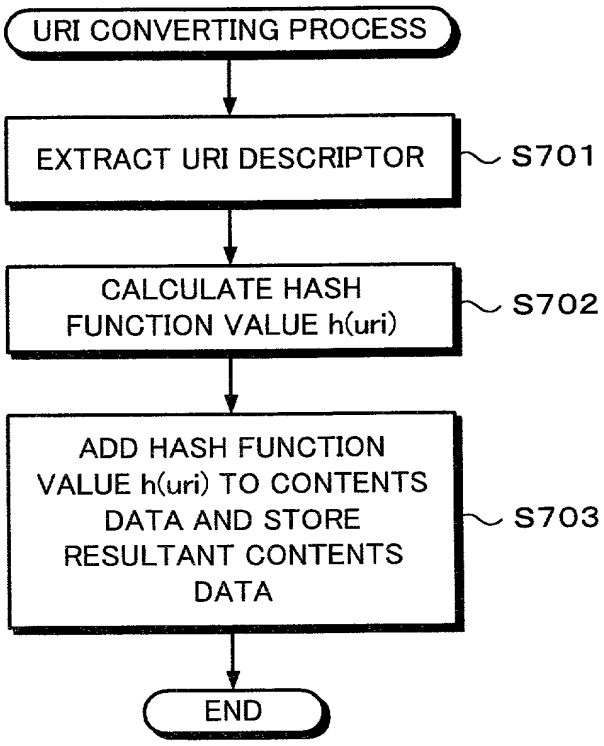
URI CONVERTING PROCESS
EXTRACT URI DESCRIPTOR
S701
CALCULATE HASH FUNCTION VALUE h(uri)
S702
ADD HASH FUNCTION VALUE h(uri) TO CONTENTS DATA AND STORE RESULTANT CONTENTS DATA
S703
END

Fig. 8

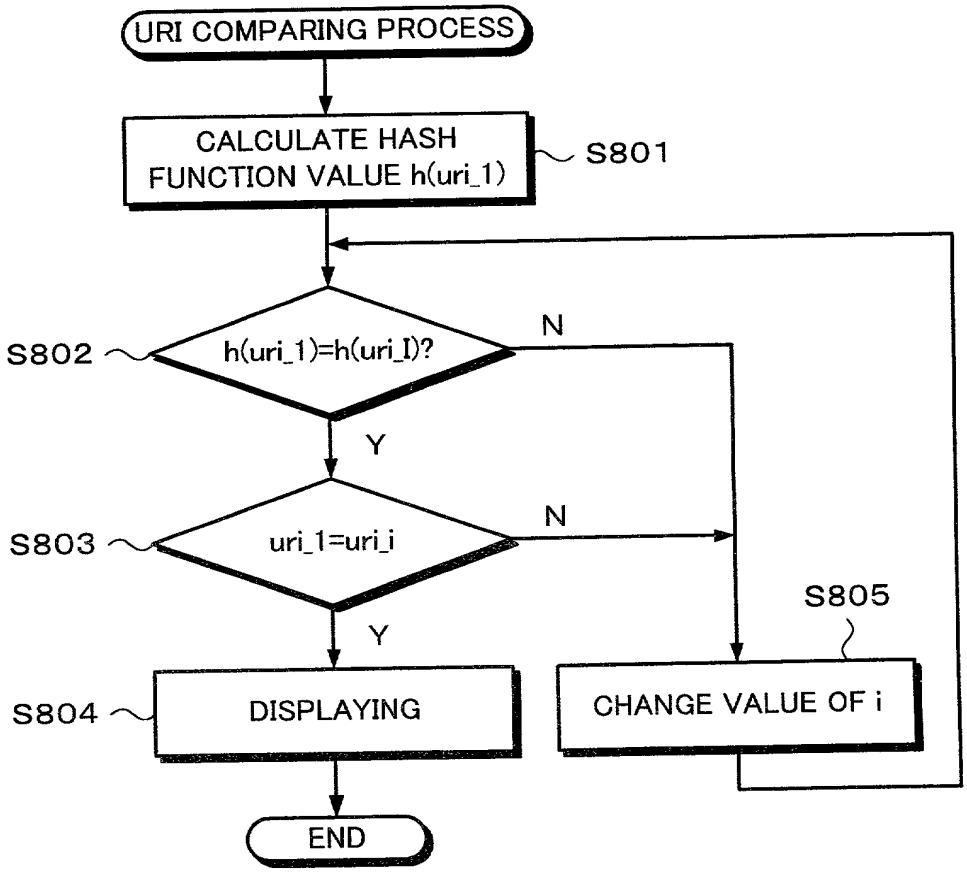
URI COMPARING PROCESS
CALCULATE HASH FUNCTION VALUE h(uri_1)
S801
S802
h(uri_1)=h(uri_I)?
N
Y
S803
uri_1=uri_i
N
Y
S805
S804
DISPLAYING
CHANGE VALUE OF i
END

Fig. 9

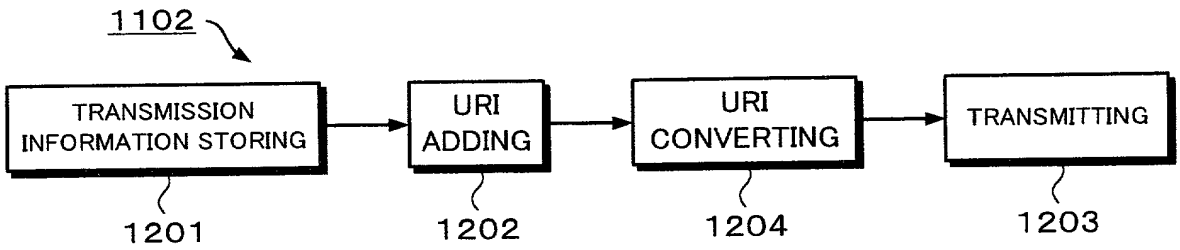
1102
TRANSMISSION INFORMATION STORING
URI ADDING
URI CONVERTING
TRANSMITTING
1201
1202
1204
1203

Fig. 10

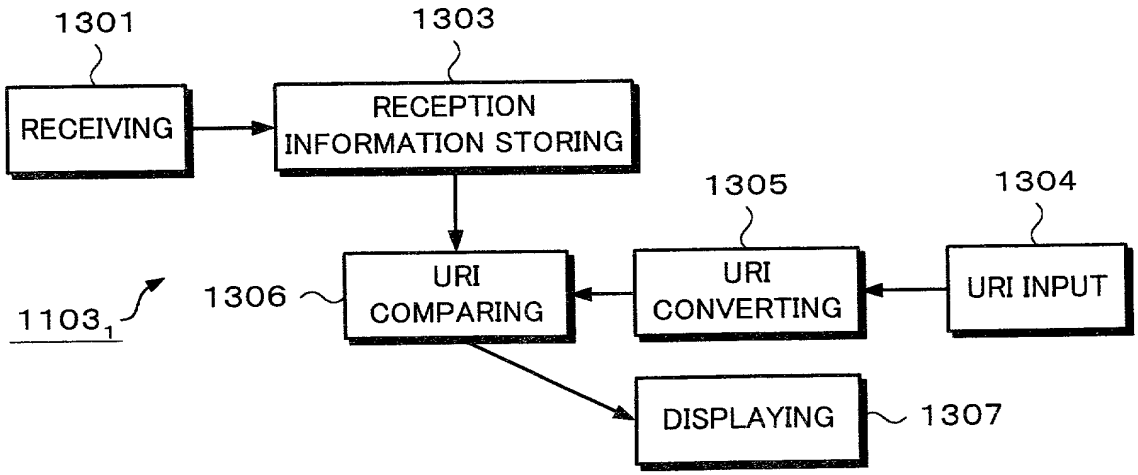
1301
1303
RECEIVING
RECEPTION INFORMATION STORING
1305
1304
1103₁
1306
URI COMPARING
URI CONVERTING
URI INPUT
DISPLAYING
1307

Fig. 11

```
URI_descriptor( ) {
        descriptor_tag
        descriptor_length
        for (i=0;i<N;i++) {
                URI_character
        }
        URI_hash_value
```

Fig. 12

event_id: 100
start_time: 21:00
duration: 60min
URI_descriptor:
lid://www.abc.com/abc_news/night
b2a11afc568b6df62badef691cf0b1ed

202 ... URI ADDING PORTION
302 ... URI CONVERTING PORTION
305 ... URI CONVERTING PORTION
306 ... URI COMPARING PORTION
1202 ... URI ADDING PORTION
1204 ... URI CONVERTING PORTION
1305 ... URI CONVERTING PORTION
1306 ... URI COMPARING PORTION

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Declaration and Power of Attorney for Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

私は、以下に記名された発明者として、ここに下記の通り宣言する：

As a below names inventor, I hereby declare that:

私の住所、郵便の宛先そして国籍は、私の氏名の後に記載された通りである。

My residence, post office address and citizenship are as stated next to my name:

下記の名称の発明について、特許請求範囲に記載され、且つ特許が求められている発明主題に関して、私は、最初、最先且つ唯一の発明者である（唯一の氏名が記載されている場合）か、或いは最初、最先且つ共同発明者である（複数の氏名が記載されている場合）と信じている。

I believe I am the original, first and sole inventor if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled. Transmitting Apparatus, Receiving Apparatus, Transmitting and Receiving System, Transmitting Method, and Receiving Method

上記発明の明細書はここに添付されているが、下記の欄がチェックされている場合は、この限りでない：

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☒ was filed on 3 March 2000
as United States Application Number of
PCT International Application Number PCT/JP00/01271
_____ and was amended on
_____ (if applicable).

私は、上記の補正書によって補正された、特許請求範囲を含む上記明細書を検討し、且つ内容を理解していることをここに表明する。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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Prior Foreign Application(s) 外国での先行出願		Priority Not Claimed 優先権主張なし
11-055859 (Number) （番号）	Japan (Country) （国名）	
		3 March 1999 (Day/Month/Year Filed) ☐
PCT/JP00/01271 (Number) （番号）	PCT (Country) （国名）	
		3 March, 2000 (Day/Month/Year Filed) ☐
(Number) （番号）	(Country) （国名）	☐ (Day/Month/Year Filed)
(Number) （番号）	(Country) （国名）	☐ (Day/Month/Year Filed)
(Number) （番号）	(Country) （国名）	☐ (Day/Month/Year Filed)
(Number) （番号）	(Country) （国名）	☐ (Day/Month/Year Filed)

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(Application No.) （出願番号）	(Filing Date) （出願日）

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(Supply similar information and signature for third and subsequent joint inventors)

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3-a

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4-a

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5-a

Yasuaki YAMAGISHI

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